

Remarks

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Claims 17 and 69 have been amended. Claims 1-16, 27-68, and 75-91 have previously been withdrawn. Support for the amendments can be found at least in paragraphs 0015 and 0045 of the application as originally filed. Accordingly, Claims 1-21 and 23-91 (90 claims) will be pending in the present application upon entry of this Reply and Amendment.

A detailed listing of all claims that are, or were, in the application, irrespective of whether the claims remain under examination in the application, is presented, with an appropriate defined status identifier.

Claim Rejections – 35 U.S.C. § 103

On pages 2-6 of the Final Office Action, the Examiner has rejected Claims 17-19, 21, 23, 25, 26, and 69-73 under 35 U.S.C. § 103(a) as being unpatentable over Birkhead et al. (US Patent No. 6,536,522) ("Birkhead") in view of Pavlov et al. (US Patent No. 6,683,428) ("Pavlov").

Birkhead is directed to an "artificial lift apparatus with automated monotrain characteristics." Various pressure sensors are disposed in the wellbore and signals from the sensor are used to control a pump in the wellbore.

Pavlov is directed to a "method for controlling torque in a rotational sensorless induction motor control system with speed and rotor flux estimation." Pavlov is concerned with vector control of an induction motor used in a hybrid power train for an automobile vehicle wherein the induction motor compliments an internal combustion engine to establish torque flow to vehicle traction wheels. (See col. 1, lines 1 through 8). Pavlov also states that it is a "special form if an induction motor model." (See col. 2, lines 9-10)

The Examiner believes that Birkhead discloses all of the limitations substantially as claimed in the present application except for the specific limitations pertaining to the means by which the torque and speed are calculated. The Examiner also believes that Pavlov teaches a control method for a motor including measuring voltages and currents of the motor in using the measured values of voltage and current drawn by the motor to calculate a value for the motor speed and torque. The Examiner states "It would have been obvious to one of ordinary skill in the art to have applied the teaching of Pavlov in determining torque and speed to the nominal sensor of Birkhead in order to achieve the predictable results of determining the torque and speed of the motor."

Claim 17 of the present application is in independent form and recites a "method of controlling a progressing cavity pump for transferring fluid within a fluid system, wherein the progressing cavity pump is coupled to an electric motor" comprising, in combination with other elements, "determining values of torque and speed inputs to the progressing cavity pump without downhole sensors by measuring electric voltages applied to the motor and currents drawn the motor, and using the measured values of electrical voltages applied to the motor and currents drawn by the motor to calculate the values and torque and speed inputs to the progressing cavity pump" Claims 17-19, 21, 23, 24, and 26 depend from independent Claim 17.

Claim 69 of the present application is in independent form and recites a "pump control system for controlling a progressing cavity pump for transferring fluid within the fluid system, wherein the progressing cavity pump is coupled to an electric motor" comprising, in combination with other elements, a "means for determining values of torque and speed inputs to the progressing cavity pump, without downhole sensors, by measuring electrical voltages applied to the motor and currents drawn by the motor, in using the measured values of electrical voltages applied to the motor and current drawn by the motor to calculate the values of torque and speed inputs to the progressing cavity pump" Claims 70-73 depend from independent Claim 69.

The method of controlling a progressing cavity pump and a pump control system for controlling a progressing cavity pump recited in independent Claims 17 and 69 would not have been obvious in view of Birkhead, alone or in any proper combination with Pavlov under 35 U.S.C. § 103(a). Birkhead, alone or in any proper combination with Pavlov does not disclose, teach or suggest that a method of controlling a progressing cavity pump or a pump control system for controlling a progressing cavity pump comprising, in combination with other elements, "determining values of torque and speed inputs into the progressing cavity pump, without downhole sensors." To transform the artificial lift apparatus of Birkhead and the method of controlling torque in a rotational sensorless induction motor of Pavlov into that which is disclosed and claimed in the present application would require still further modification, and such modification is taught only by the Applicants' own disclosure. The suggestion to make the combination of Birkhead and Pavlov have been taken from the Applicants' own Specification (using hindsight), which is improper.

The present application discloses and claims that the determination of values of torque and speed inputs into the progressing cavity pump is done without downhole sensors (see specifically para. 0045 of the present application as originally filed). The Examiner acknowledges that Birkhead specifically requires sensors in making his calculations (see page 7 of the Final Office Action). The Examiner also acknowledges that Pavlov teaches the use of torque of the motor as a value but simply for using the measured values of torque and current drawn by the motor to calculate a value for the motor speed and torque. (See Final Office Action, page 7.) However, Pavlov uses the speed and flux determinations from the current and voltage of the monitored induction motor but for purposes of controlling the motor in conjunction with an internal combustion engine (see col. 2, lines 1 through 8 of Pavlov) not for controlling the internal combustion engine.

In contrast, the present application specifically states that determining the values of torque and speed inputs to the progressing cavity pump is done without sensors contrary to Birkhead and contrary to Pavlov which teaches the vector control of the induction motor. The present application teaches the control of a progressing cavity pump based on the value obtained from the electric motor powering the pump.

Applicants submit that controlling a progressing cavity pump from voltage and currents drawn by the motor to calculate the values and torque and speed inputs to the progressing cavity pump is not the same as controlling an induction motor coupled to an internal combustion engine without controlling that engine.

The Examiner has not articulated any reason why one ordinarily skilled in the art of downhole progressing cavity pump control would modify Birkhead as suggested by the Examiner. On page 4 of the Final Office Action, the Examiner states "It would have been obvious to one of ordinary skill in the art to have applied the teachings of Pavlov in determining torque and speed to the nominal sensor of Birkhead in order to achieve the predictable results of determining the torque and speed of the motor. (emphasis added) As such, the Examiner's suggested combination of Birkhead and Pavlov does not eliminate the nominal sensor of Birkhead. In other words, even as combined as suggested by the Examiner Birkhead still requires the downhole sensors. As such, that combination of Birkhead and Pavlov is not obvious over that which is disclosed and claimed in the present application since each of the independent Claims 17 and 69 of the present application determine their values of torque and speed to the progressing cavity pump "without downhole sensors."

Further, the Examiner also states that even the combination of Birkhead and Pavlov if combined as suggested by the Examiner does not explicitly disclose the pump parameter is pump flow. Applicants note that the Examiner is commenting on a claim that depends from independent Claim 17, however, Applicants submit that that is mere speculation on the part of the Examiner not a fact based assertion.

Applicants submit that taken as a whole the Examiner has not presented a *prima facie* case if obviousness over that which is disclosed and claimed in the present application.

The "method of controlling a progressing cavity pump" recited in independent Claim 17 and the "pump control system for controlling a progressing cavity pump" recited in independent Claim 69, considered as a whole, would not have been obvious in view of Birkhead and/or Pavlov. The rejection of independent Claim 17 and independent Claim 69 over Birkhead in view of Pavlov under 35 U.S.C. § 103(a) is improper. Therefore, independent Claims 17 and 69 are patentable over Birkhead in view of Pavlov.

Dependent Claims 18, 19, 21, 23, 24, and 26 which depend from independent Claim 17 and dependent Claims 70-73 which depend from independent Claim 69 are also patentable. See 35 U.S.C. § 112, para. 4.

The Applicants respectfully request withdrawal of the rejection of Claims 17-19-21, 23, 24, 26, and 69-73 under 35 U.S.C. § 103(a).

On page 5 of the Final Office Action, the Examiner has rejected Claim 73 under 35 U.S.C. § 103(a) as being unpatentable over the references applied to Claim 69 above in view of Kawabata et al. (US Patent No. 6,244,831).

In response, Applicants note that Claim 73 depends from independent Claim 69. Applicants reiterate their comments with respect to Birkhead and Pavlov as applied to independent Claim 69 as if set forth herein in full. Accordingly, since Applicants believe that independent Claim 69 is patentable over the cited prior art, dependent Claim 73 is also patentable. See 35 U.S.C. § 112, para. 4.

Therefore, Applicants respectfully request that the Examiner withdraw his rejection of Claim 74 under 35 U.S.C. § 103(a).

Allowable Subject Matter

Applicants note that the Examiner has allowed Claims 20, 25, and 74 which are in independent form.

Response to Examiner's Argument

On pages 6 and 7 of the Final Office Action, the Examiner comments with respect to Applicants' amendments filed in the December 24, 2008 Response.

Applicants submit that the Examiner's comments are moot in light of the amendments and comments as set forth above. Further specifically, on page 7 of the Final Office, the Examiner states "It is true that Birkhead also discloses the use of pressure sensors, but the claims do not preclude this, as long as the torque measurements also measure and control a parameter." (emphasis added) As amended, independent Claims 17 and 69 specifically preclude the use of pressure sensors as fully supported at least in paras. 0015 and 0045 of the present application as originally filed. Since the Examiner has not indicated why one ordinarily skilled in the art would eliminate the downhole sensors required by Birkhead and Pavlov doesn't even discuss or teach control of a progressing cavity pump in a downhole structure, one ordinarily skilled in the art would not be compelled to combine Birkhead and Pavlov as suggested by the Examiner. The combination of Birkhead and Pavlov does not set forth a *prima facie* case of obviousness over that which is disclosed and claimed in the present application.

* * *

It is submitted that each outstanding objection and rejection to the application has been overcome, and that the application is in condition for allowance. The Applicant requests consideration and allowance of all pending claims.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

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